COFC

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Bruno GHYSELEN et al.	Confirmation No.: 2494
Patent No.: 7,018,909 B2	Application No.: 10/784,016
Patent Date: March 28, 2006	Filing Date: February 20, 2004
For: FORMING STRUCTURES THAT INCLUDE A RELAXED OR PSEUDO-RELAXED LAYER ON A SUBSTRATE	Attorney Docket No.: 4717-10000

REQUEST FOR CERTIFICATE OF CORRECTION
UNDER 37 C.F.R. §§ 1.322 and 1.323

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Patentees hereby respectfully request the issuance of a Certificate of Correction in connection with the above-identified patent. The corrections are listed on the attached Form PTO-1050. The corrections requested are as follows:

Title Page:

Item [56] **References Cited**,

U.S. PATENT DOCUMENTS, after "2003/0003679 A1" change "6/2003" to -- 1/2003 --.

FOREIGN PATENT DOCUMENTS, after "FR 2 818,010" change "8/2002" to -- 6/2002 --.

OTHER PUBLICATIONS,

"B. Holländer et al." reference, after "heterostructures after hydrogen" change "of" to -- or --; and after "357-367" delete "(2001)".

"K.D. Hobart et al." reference, change "Electronic Materials" to -- Journal of Electronic Materials --.

"Q.Y. Tong et al." reference, change "Johnson Wiley & Sons" to -- John Wiley & Sons--.

"T. Tezuka et al." reference, change "Ultizing" to -- Utilizing --.

"S. Mantl et al." reference, change "SGe" to -- SiGe --; and change "Nuclear Instruments and Methods in Physics Research" to -- Nuclear Instruments and Methods in Physics Research B --.

Column 17:

Line 1 (claim 17, line 1), after "The method of claim" change "**16**" to -- **8** --.

The requested changes are to correct inadvertent errors of a clerical or typographical nature and do not involve changes that would constitute new matter or require reexamination.

A fee of $100 is believed to be due for this request. Please charge the required fees to Winston & Strawn LLP Deposit Account No. 50-1814. Please issue a Certificate of Correction in due course.

Respectfully submitted,

4/4/06
Date

Allan A. Fanucci, Reg. No. 30,256

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212-294-3311

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO.: 7,018,909 B2
DATED: March 28, 2006
INVENTORS: Ghyselen et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page,
Item [56] **References Cited**,
U.S. PATENT DOCUMENTS, after "2003/0003679 A1" change "6/2003" to -- 1/2003 --.
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Line 1 (claim 17, line 1), after "The method of claim" change "**16**" to -- **8** --.

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(12) **United States Patent**
Ghyselen et al.

(10) **Patent No.: US 7,018,909 B2**
(45) **Date of Patent: Mar. 28, 2006**

(54) **FORMING STRUCTURES THAT INCLUDE A RELAXED OR PSEUDO-RELAXED LAYER ON A SUBSTRATE**

(75) Inventors: **Bruno Ghyselen**, Seyssinet-Pariset (FR); **Carlos Mazure**, St. Nazaire les Eymes (FR); **Emmanuel Arene**, Biviers (FR)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **10/784,016**

(22) Filed: **Feb. 20, 2004**

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Related U.S. Application Data

(60) Provisional application No. 60/483,476, filed on Jun. 26, 2003.

(30) **Foreign Application Priority Data**

Feb. 28, 2003 (FR) 03 02518

(51) **Int. Cl.**
H01L 21/30 (2006.01)
H01L 21/46 (2006.01)

(52) **U.S. Cl.** **438/455**; 438/458; 438/459; 438/752

(58) **Field of Classification Search** 438/406, 438/455, 458, 459, 752
See application file for complete search history.

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(Continued)

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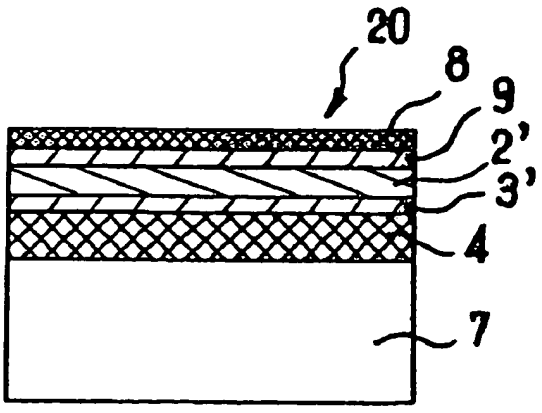
(57) **ABSTRACT**

The invention relates to methods of forming a relaxed or pseudo-relaxed layer on a substrate, wherein the relaxed layer may be a semiconductor material. An implementation of the method includes growing an elastically stressed semiconductor material layer on a donor substrate, forming a glassy layer of a viscous material and bonding it to the stressed layer, removing a portion of the donor substrate to form a structure that includes the glassy layer, the stressed layer and a surface layer of donor substrate, and then heat treating the structure at a temperature of at least a viscosity temperature of the glassy layer to relax the stressed layer. The glassy layer can also be bonded to a receiving substrate so that the structure can be transferred thereto. Implementations also relate to structures obtained from the method.

31 Claims, 6 Drawing Sheets



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17. The method of claim 16 wherein the glassy layer is SiO_2.

18. The method of claim 1, wherein forming the second glassy layer comprises using a controlled thermal oxidization treatment for transforming at least a portion of Si in the surface layer into SiO_2 to form a second SiO_2 glassy layer.

19. The method of claim 18 which further comprises, after the heat treating step, using a chemical treatment based on hydrofluoric acid to remove the second glassy layer.

20. The method of claim 1 wherein the glassy layer is also formed on a receiving substrate and the structure includes the receiving substrate bonded to the glassy layer.

21. The method of claim 20, wherein the glassy layer is formed on the receiving substrate, and wherein, before bonding, a thin layer is formed on the stressed layer having a thickness that is less than that of the stressed layer.

22. The method of claim 20, which further comprises forming a bonding layer on the receiving substrate prior to forming the glassy layer thereon.

23. The method of claim 22 wherein the bonding layer is an SiO_2 material.

24. The method of claim 1, which further comprises applying a smoothing treatment on the surface layer after the portion of the donor substrate is removed.

25. The method of claim 24, wherein the smoothing comprises conducting a rapid thermal anneal.

26. The method of claim 24, wherein the smoothing comprises oven annealing of the surface layer in an argon and hydrogen atmosphere.

27. The method of claim 24, wherein the surface layer comprises silicon.

28. The method of claim 24, wherein the smoothing treatment comprises polishing the surface layer in order to obtain a thickness of between about 200 to about 800 Å.

29. The method of claim 28, which further comprises conducting a rapid thermal anneal prior to the polishing.

30. A method of forming a structure that includes a relaxed or pseudo-relaxed layer on a substrate comprising:

growing an elastically stressed layer of semiconductor material on a donor substrate;

growing a semiconductor layer to a desired thickness on the elastically stressed layer;

forming a first glassy layer of a viscous material as part of the thickness of the semiconductor layer;

removing a portion of the donor substrate to form a structure that includes the first glassy layer, the stressed layer, the semiconductor layer and the portion of the donor substrate as a surface layer;

forming a second glassy layer of a viscous material as part of the thickness of the surface layer;

removing the second glassy layer to expose the surface layer that remains; and

growing a layer of semiconductor material on the surface layer to provide a stressed surface layer upon the structure.

31. The method of claim 30, wherein the substrate and semiconductor layer and semiconductor material each comprises Si and the stressed layer is $Si_{1-x}Ge_x$ where x is at least 0.1.

* * * * *

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